leaves the mercurial surface, and generally bursts in doing so.

Considerable impurities in the mercury do not render the production of these bubbles impossible. Very stable bubbles may be formed of mercury contaminated with sodium. But the most stable have been formed from mercury recently cleaned with dilute nitric acid followed by a solution of caustic potash.

Another striking and beautiful experiment with the production of these bubbles may be made by directing a strong jet of water into a shallow vessel containing some mercury. The stream of water, carrying air bubbles with it, penetrates the supernatant water and impinges on the mercury below. There it forms numerous bubbles of various sizes contained in mercury pellicles, many of which detach themselves from the mercury below, and are carried about in the water. The stability of these bubbles is amazing. They are often whirled round and round in the turbulent motion of the water for several seconds without bursting.

HENRY H. DIXON.

Botanical Laboratory, Trinity College, Dublin.

Radium Fluorescence.

IF a tube containing radium bromide is wrapped in black paper and brought within three or four inches of the eye, in a dark room, a curious sensation of general illumination of the eye is experienced; this occurs whether the eyelid is closed or not. It is difficult accurately to describe the sensation produced; the eye seems filled with light. This effect can readily be detected when six florins are placed between the closed eye and the sample of radium.

Probably the effect is due to general fluorescence of every part of the eye, for fluorescence seems to be a commoner property of matter than hitherto suspected.

The following substances are distinctly fluorescent under radium radiation:—

Opal Glass.	Quartz.	Human Skin.
Soda Glass.	Sulphur.	Human Nails.
Lead Glass.	Sugar.	Camphor.
Uranium Glass.	Starch.	Cetaceum.
Didymium Glass.	Fluor Spar.	Solid Paraffin.
Celluloid.	Yellow Resin.	Liquid Paraffin.
Mother of Pearl.	Cotton Wool.	Turpentine.
Mica.	White Paper.	Chloroform.
Borax.	Cupri Sulph.	Water.
Alum.	Quinine Sulph.	Glycerin.

I have been unable to detect decided fluorescence in the following substances, however, with a more powerful source of radiation, or a more sensitive receiver than the eye; possibly some of these might be placed in the first list:—

Potass Bichrom.	Selenium.
Ruby Glass (flashed).	Plaster of Paris.
Prepared Chalk.	Iodosulphate of Quinine.
Ebonite.	Woods (various).
Silk.	Camphor Monobromate.

In the case of translucent substances, the effects are best observed by looking through the substance, placing the tube of radium nearly in contact with the far side. If the experiments are carried on too near the eye, the direct fluorescence of the eye itself interferes with accurate observations.

Little cups made of thick tinfoil are very convenient for the examination of liquids; the open vessel is viewed from above, the radium being placed below the cup.

It is important to well prepare the eye by excluding every trace of light from the room for at least a quarter of an hour before the experiments are made.

F. HARRISON GLEW.

156 Clapham Road, S.W., June 1.

A New Series in the Magnesium Spectrum.

IN your issue of April 16 there is an abstract of a paper communicated by Prof. Fowler on the above subject to the Royal Society. He shows that his new series is of the same type as the special series for magnesium discovered by Rydberg, and represents it by a similar formula to that used by Rydberg. But in "The Cause of the Structure of Spectra" (*Phil. Mag.*, September, 1901) I have shown that the Rydberg series for magnesium can be represented by a formula which brings out the existence of harmonics in atomic vibrations. These can be demonstrated in the hydrogen spectrum also, but it seemed to be of interest to inquire whether the new series gives a further example of the existence of optical harmonics. It does, for the vibration numbers of its four lines can be given by the formula

$$n = 39730 - \frac{107250}{(2{\cdot}977 - 2{\cdot}021/s)^2}$$

where s has the values 4, 5, 6 and 7.

This may be written approximately as

$$n = 39730 - \frac{107250}{\{3 - 0{\cdot}023 - (2 + 0{\cdot}023)/s\}^2}$$

while Rydberg's special series is represented by

$$n = 39730 - \frac{107250}{(3 - 2{\cdot}343/s)^2}.$$

I have not thought it worth while to test whether the harmonic formula for the new series is as successful as Rydberg's in giving the wave-lengths accurately, as the evidence for the existence of optical harmonics is what I wish to draw attention to. In Rydberg's series s has all the integral values from 3 to 8. In the new series Prof. Fowler gives wave-lengths for which s has integral values from 4 to 7. We might expect the lines for $s=3$ and $s=8$ to be yet found. Their wave-lengths by the harmonic formula would be 5125·8 and 3956·3.

Melbourne, May 27. WILLIAM SUTHERLAND.

THE KITE COMPETITION OF THE AERONAUTICAL SOCIETY.

THE kite competition for the silver medal of the Aëronautical Society of Great Britain took place on Thursday, June 25, on the Sussex Downs, at Findon, near Worthing, by permission of Lord Henry Thynne. The conditions specified that a weight of two pounds as representing the weight of recording meteorological instruments should be carried, and that the medal should be given for the highest flight attained by a single kite above 3000 feet. The altitude of the kites was to be determined by trigonometrical observations.

The locality proved to be admirably adapted for the competition under the conditions of weather prevailing at the time. A light wind from the south-west blew up the slope of the Downs in the morning, and increased to a steady breeze in the afternoon, backing somewhat to the southward as the day, which was beautifully fine, went on.

It was understood that observations of the altitude of the kites should be commenced after the lapse of an hour from the signal for starting. By 2.45 p.m. stations for the kite reels had been arranged, 200 yards apart, along the slope of the Downs, and two stations for the theodolites, 700 yards apart, were selected, from which the kite stations were visible, and which were likely to command an uninterrupted view of the kites during the flight. The responsible duty of carrying out the measurements with the theodolites and the auxiliary chaining was most kindly undertaken by Mr. J. E. Dallas and Mr. W. F. Mackenzie, of the Royal Indian Engineering College, Coopers Hill, and the success of the arrangements was due in no small degree to the assistance afforded by these gentlemen.

At 2.45 the signal was given to start, and at 3.45 observations of height commenced. The synchronism of the observations of any particular kite from the two stations was secured at first by a prearranged code of signals from one theodolite station to the other, and subsequently by telephone between the two stations. Eight kites were entered for the competition, but only six appeared on the ground, and only

four reached a height sufficient to require trigonometrical determination. These were a Hargrave kite, of rhomboidal cross section, with four bands of linen, by Mr. S. H. R. Salmon; a kite of special design, by Mr. S. F. Cody, having the appearance in the air of a very large bird; a similar kite by Mr. L. Cody, and a Burmese kite by Mr. Charles Brogden.

In the course of an hour, four sets of observations were obtained for each kite, and were subsequently computed by Mr. Mason, of King's College, London, in accordance with a systematic programme drawn up by Prof. C. Vernon Boys.

As the result of the calculations, it appears that the greatest height measured for Mr. Salmon's kite was 1250 feet, for Mr. L. Cody's 1476 feet, for Mr. Brogden's 1816 feet, and for Mr. S. F. Cody's 1407 feet, and, therefore, none reached the minimum height required for the award of the medal. This unfortunate result was probably due to the fact that the wind, which had gradually increased from a light air as the sunshine continued, was a surface wind, and fell off in strength at some little height above the surface. The average heights of the several kites from the four observations of each were 1189 feet, 1271 feet, 1554 feet, and 1326 feet respectively.

At 4.45 the signal was given to haul in the kites, and all but one were safely brought back. The wire of this one had become entangled in the trees, and the kite was still in the air when the majority of the visitors had left the ground. The winding gear was in each case hand gear.

The supervision of arrangements for the competition was entrusted to a jury consisting of Dr. W. N. Shaw, F.R.S. (chairman), Prof. C. V. Boys, F.R.S., Mr. E. P. Frost, J.P., D.L., Sir Hiram Maxim, Dr. Hugh Robert Mill, Mr. E. A. Reeves, and Mr. Eric Stuart Bruce, secretary of the Aëronautical Society.

The society and its energetic secretary are to be congratulated upon having carried out successfully a series of arrangements that were necessarily elaborate, and not free from difficulties of many kinds.

THE CELTIC GOLD ORNAMENTS.

THE decision in the Court of Chancery that the gold ornaments from the north of Ireland, and bought as long ago as 1897 by the British Museum, are treasure trove, and, therefore, are to be taken from the Museum and handed over to the King, will produce a curious effect on the mind of the intelligent foreigner. But when he is told that the action at law is due to the persistent claims of the irreconcilable Irish party, he will probably begin to understand the position, from analogous conditions in his own country. The whole affair is to be regretted, but it must in fairness be stated that the entire blame lies at the door of the Irish executive, and that but for their incomprehensible apathy in making no effort to secure the ornaments before the British Museum ever entered the field, there would have been no need for a costly lawsuit. There is, however, a wider application of this particular example, arising from the contention of the Irish archæologists that all antiquities found in Ireland must remain there. Foreign students coming to an institution like the British Museum will expect to find there, primarily, an adequate representation of the archæology of the British Islands—surely not an unreasonable expectation in the central museum of the Empire. But if the Irish contention is to prevail, Scotland will claim equal rights, and Wales also when it decides on a capital for the Principality, so that the earnest student, not generally a wealthy individual, will be compelled to seek out what he wants in widely separated cities. There are, of course, arguments in favour of such a course; but, as a practical matter, there are, in fact, ancient remains enough in these islands to admit of the central museum having a fair comparative series, without in any way damaging the local museum. A little mutual understanding is all that is wanted, and it is to be hoped that the parochial idea that seems to prevail in Dublin will not be thought worthy of Edinburgh. London, after all, is the capital of these islands, and, for one foreign or English student in Dublin or Edinburgh, there are fifty, or, may be, a hundred, who work in London. The greater the number of workers, the greater will be the benefit to science.

THE UNIVERSITY OF LONDON.

THE presentation of degrees at the University of London, which took place as we went to press last week, was noteworthy in several respects. Honorary degrees were conferred for the first time in the history of the university, the recipients being the Prince and Princess of Wales, Lord Kelvin and Lord Lister; and representatives of the many and various institutions and organisations which are connected with the university, or are promoting its development, were also assembled together for the first time.

In his report on the work of the university during the year 1902–03, the principal, Sir Arthur Rücker, gave a short description of the educational scheme of the reconstituted university, beginning with arrangements which are primarily intended to be of benefit to those who are not aiming at degrees, and proceeding through the various stages of a university course to post-graduate study and research.

The following are some of the points of general interest mentioned in the report:—

Relation of the University to Schools.—The matriculation examination of the University of London has for many years served some of the purposes of a school-leaving examination. Persons who had passed it were excused by various professional bodies from their own entrance examinations; and for this or other reasons the examination was taken by many candidates who did not intend to pursue a university career. On the other hand, the Senate has for long included the examination of schools among its duties, and of late it has been felt that the time has come for performing this work on more modern lines and on an extended scale. A scheme has therefore been approved by the Senate for the inspection of schools, and the university has been recognised by the Board of Education as an authority under the Board for that purpose. This inspection will include an inquiry into the aims of the school, a consideration of its curriculum and arrangements as adapted to those aims, an inspection of the school buildings and fittings, and of the teaching work of the staff as tested by an inspection of the classes at work.

Entrance to the University.—The first matriculation examination under the new scheme took place in September last. It is a real matriculation examination in the sense that no candidate can begin his university career until he has passed it. It represents the minimum standard of admission to the university, and is intended to be such that it can be passed without special preparation or cramming by a well-educated boy or girl of about seventeen years of age.

The Senate has agreed to waive the matriculation examination altogether in the case of graduates of a large number of approved universities, and of persons who have passed the Scotch leaving examination or hold the *Zeugniss der Reife* from a Gymnasium or Real-Gymnasium within either the German or the Austrian Empire. A large number of persons have availed themselves of this privilege, which will be particularly valuable to those who may intend to supplement a degree taken at another university by study in London.